CITY OF HOUSTON
FIRE PREVENTION BUREAU
HOUSTON FIRE DEPARTMENT

LIFE SAFETY BUREAU (LSB) STANDARD 11

ROOFING OPERATIONS

SUPERCEDES: **HFD STANDARD 11-3 (5/21/99)**

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LSB STANDARD 11

ROOFING OPERATIONS

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LSB STANDARD 11

ROOFING OPERATIONS

SECTION 1 --- GENERAL

1.1 Scope.
This standard applies to the application of roofing materials to a building or structure within City of Houston, involving the use of an asphalt kettle or torch.

1.2 Purpose.
This standard shall prescribe the minimum safeguards during the application of roofing materials.

SECTION 2 --- DEFINITIONS

2.1 Barrel.
Forty-two (42) U.S. gallons.

2.2 Certificate of Training.
A certificate of training indicating the person in possession of the certificate has completed an approved course of instruction on the proper application of torch applied modified bitumen roof system to a roof using a flame-producing device and the proper use of an infrared temperature scanner.

2.3 Container.
Any vessel, including cylinders, tanks, portable tanks and cargo tanks, used for transporting and storing LP-gas.

2.4 Course Of Instruction.
The material used to certify personnel on the proper application of roofing material. For the purpose of this standard approved course of study will be the Certified Roofing Torch Applicator program (CERTA) provided by the Midwest Roofing Contractors Association (MRCA).

2.5 Cylinder.
A portable container constructed to U.S. Department of Transportation (DOTn) cylinder specifications, or in some cases constructed in accordance with the ASME Code of a similar size and for similar service. The maximum size permitted under DOTn specifications is 1000-lb water capacity.

2.6 District of Limitations (DOL).
DOL No.1. (Downtown – Central Business District)
Beginning at the intersection of U.S. Highway 59 with Pierce Street; thence northerly along U.S. Highway 59 to the centerline of Buffalo Bayou; thence, westerly following the meanders of Buffalo Bayou to Franklin Street; thence, westerly along Franklin Street to Interstate Highway 45; Thence, southerly along Interstate Highway 45 to Pierce Street; thence easterly along Pierce Street to U.S. Highway 59, the place of beginning.

DOL No. 2. (The Texas Medical Center)

Beginning at the intersection of Main Street with North MacGregor Way; thence southerly along Main Street to Holcombe Boulevard; thence easterly along Holcombe Boulevard to South Braeswood Boulevard; thence northerly along South Braeswood Boulevard to North MacGregor Way; thence westerly along North MacGregor Way to Main Street, the place of beginning.

DOL for the purpose of this standard, and in accordance with the *Fire Code,* restrict the use and storage of LP-gas in DOL No. 1 and DOL No. 2.

2.7 Excess Flow Valve (also called Excess-Flow Check Valve).
A device designed to close when the liquid or vapor passing through it exceeds a prescribed flow rate as determined by pressure drop.

2.8 High Rise Building.
Buildings having floors used for human occupancy located more than 75 feet above the lowest level of fire department vehicle access.

2.10 Roofing Operations.
Operations including but not limited to torch applied roofing, roofing kettle or any other similar situation.

2.11 Listed.
Equipment or materials included in a list published by an organization acceptable to the Fire Marshal.

2.12 LP-gas.
Liquefied petroleum gas.

2.1.3 Protected Structure.
For the purpose of this Standard, "protected structures" are structures equipped with automatic sprinklers or Class I, II, or III wet standpipe systems for fire department use.

2.14 Roofing Kettle.
Any container used for pre-heating tar, asphalt pitch or similar substances for waterproofing.

2.15 Torch Applied Roof Systems.
Bituminous roofing systems using membranes that are adhered by heating with a torch and melting asphalt back coating instead of the application of hot asphalt for adhesion.

2.16 Standby Personnel.
In the interest of public safety and due to the nature of an operation or activity, one or more Fire Inspectors, who are current members of the Life Safety Bureau of the Houston Fire Department, may be required to be on duty at such place during a roofing operation when required by the Fire Marshal.

2.17 Water Capacity.
The amount of water in either pounds or gallons required to fill a container full of water.

SECTION 3--- TORCH APPLIED ROOFING

3.1 Regulations.
Torch applied roofing shall be regulated in accordance with *City of Houston Ordinance* and the *Fire Code*.

3.1.1 Permit required.
No person shall use or cause or allow the use of any ignited torch, open flame or other flame-producing device for the purpose of constructing or repairing any roof of any building or structure unless work is performed pursuant to a valid permit issued by the Fire Marshal for the use of such device.

3.1.2 Certificate of training required.
No person shall use any ignited torch, open flame or other flame-producing device for the purpose of constructing or repairing any roof of any building or structure unless that person holds a certificate of training in the use of flame-producing devices or is working under the direct supervision of a certified person who is present on the roof at all times while the work is being performed including the monitoring period required under Section 3.1.7*, City Ordinance*.

3.1.3 Course of instruction.
To obtain a certificate of training in the use of flame-producing devices, a person shall complete a course of instruction on the proper application of torch applied modified bitumen roof system to a roof using a flame-producing device and the proper use of an infrared temperature scanner. The instruction must be obtained from a roofing industry educational institute. The course of instruction and the institute shall be approved by the Fire Marshal. Each certificate of training shall be valid for 5 years and shall reflect the certified person's name, driver's license or personal identification number, and the expiration date of the certificate of training.

3.1.4 Roof construction or repair permits requirements.
Roof Construction or repair costing less than $2000 on any one building that involves the use of a flame-producing device may be performed under an Annual Repair Permit. A Site-Specific Permit shall be required for each other use of a flame-producing device to construct or repair a roof costing $2000 or more. This Site-Specific Permit shall be valid for the period of time the applicant has shown necessary to complete the work, but not for more than one year. Site-Specific Permits shall be valid only for the buildings upon a specific tract or parcel of property, which shall be identified on the permit.

3.1.5 Safety regulations.
All roofing operations shall conform to the safety regulations of the manufacture of the roofing material for the roofing material's proper safe installation.

3.1.6 LP-gas cylinders in use.
LP-gas containers or containers of other approved fuels used for flame producing devices in roofing operations shall be shielded from the direct rays of the sun and from temperatures above 120 degrees Fahrenheit (49 degrees Centigrade). Such fuel tanks shall be used only in well-ventilated areas and shall not be allowed to remain on the roof or other areas being constructed or repaired at the end of each day's work.

All LP-gas containers used for roofing or similar operations shall be secured while being moved in a method approved by the Fire Marshal and such containers and their use must conform to the

safety regulations prescribed in NFPA Standard 58. All containers shall be positioned so that the pressure relief device is within the vapor space of the container at all times.

3.1.7 Monitoring.

Any roof being repaired by the use of a flame-producing device shall be monitored by a certified person or by competent personnel working under his/her direct supervision. Monitoring shall continue until all elevated temperatures return to ambient temperature as determined by the use of an approved infrared temperature scanner device. This monitoring period shall not be less than 30 minutes. Any area of heat concentration that indicates a continuous temperature rise shall be investigated for possible smoldering materials and necessary actions taken to prevent the ignition of such material.

3.1.8 Fire extinguishers.

There shall be at least two listed portable fire extinguishers of a minimum rating of 4-A, 20-B:C classification on each roof under construction or repair. Both fire extinguishers shall be on the roof in close proximity to the roofing operation and be readily accessible. All fire extinguishers shall have current inspection tags from a licensed fire extinguisher service company.

3.2 EQUIPMENT

3.2.1 Approved type.

All equipment such as hand held torches and torch trolleys shall be of an approved type.

3.2.2 Hand held torches.

All hand held torches shall be equipped with a pilot adjustment, flame height adjustment and a minimum of 25 ft to a maximum of 50 ft of listed hose, gauge and regulator. Hand held torches shall be equipped with properly installed torch stands or brackets. A spark lighter shall be used to ignite torches.

3.2.3 Safety valves.

Torch trolleys and multiple torches shall be equipped with listed safety valves.

3.2.4 Number of torch devices.

The number of torch devices in use on the roof of a building shall be limited to a maximum of 5 unless approved in writing by the Fire Marshal.

3.2.5 Number and quantity of LP-gas.

The number and quantity of LP-gas containers allowed on the roof of a building shall be limited to the following unless approved in writing by the Fire Marshal.

(a) The maximum number of LP-gas containers on the roof of a building within DOL No. 1 and No. 2 shall be limited to 5 with the largest container not exceeding 72-lb water capacity (30-lb. LP-gas capacity) provided all containers are connected to an approved device and in use.

(b) The maximum number of LP-gas containers on the roof of a building outside DOL No. 1 and No. 2 shall be limited to 5 with the largest container not exceeding 120-lb waters capacity (60-lb LP-gas capacity). One container not to exceed 240-lb water capacity (100-lb LP-gas capacity) may be used only when using a “Torch Trolley”.

3.3 Transportation of LP-gas.

Transportation of LP-gas within and on the roof of a building shall be in accordance with this section and NFPA Standard 58. All containers shall be positioned so that the pressure relief device is within the vapor space of the container at all times.

3.3.1 Transportation of containers within a building

(a) Movement of containers having a water capacity greater than 2½ lb (nominal one-lb LP-gas capacity) within a building shall be restricted to movement directly associated with the roofing operation.

(b) Valve outlets on containers shall be tightly plugged.

(c) Only emergency stairs not generally used by the public shall be used and reasonable precautions shall be taken to prevent the container from falling down the stairs.

(d) Freight or passenger elevators may be used when occupied only by those engaged in moving the container.

3.3.2 Buildings under construction or undergoing major renovation.

When buildings are under construction or undergoing major renovation and are not occupied by the public or, if partially occupied by the public, containers may be transported in the unoccupied portions with the prior approval of the Fire Marshal.

3.3.3 Renovation in buildings frequented by the public.

(a) During the hours of the day when the public normally is in the building the following shall apply:

(1) The maximum water capacity of individual containers shall be 72 lb (30-lb LP-gas capacity) and the number of containers shall not exceed the number of workers assigned to using the LP-gas heating devices.

(2) Containers having a water capacity greater than 2½ lb (One-lb LP-gas capacity) shall not be left unattended.

(b) During the hours of the day when the building is not open to the public, containers may be transported in the building for repair or minor renovation.

3.4. LP-gas containers on the roof of a building.

3.4.1 Container's location.

Containers on the roof of a building shall be located in areas where there is free air circulation, at least 10 feet. from building openings such as windows and doors and at least 20 feet from air intakes of air conditioning and ventilating systems. All containers shall be positioned so that the pressure relief device is within the vapor space of the container at all times.

3.4.2 Parapets
Containers shall not be located on roofs, which are entirely enclosed by parapets more than 18 inches high unless either:

(a) The parapets are breached with low level ventilation openings no more than 20 feet apart, or

(b) All openings communicating with the interior of the building are at or above the top of the parapets.

(c) There is an approved standby person on duty, in accordance with Section 2.16, while the LP-gas container is on the roof.

SECTION 4 --- ASPHALT ROOFING KETTLES

4.1 Construction of roofing kettles.

4.1.1 Material and methods.
The materials and methods of construction of roofing kettles shall be acceptable to the Fire Marshal. This section shall apply to all roofing kettles or tar pots. The following are minimum requirements:

(a) No roofing kettle shall have a capacity in excess of 5 barrels.

(b) Roofing kettles 2-barrel capacity or less shall be constructed of sheet steel having a thickness of not less than 0.105 in (No. 12 Manufactures' Standard Gage) and kettles of more than 2-barrel capacity shall be constructed of sheet steel having a thickness of not less than 0.135 in (No. 10 Manufactures' Standard Gage).

(c) All supports, corners, and the top and bottom of the fire box shall be bound with angle iron or other reinforcements approved by the Fire Marshal. All doors shall be hinged, closely fitted, and adequately latched. Fireboxes shall be of sufficient height from the ground or provided with a system of shields or insulation to prevent heat damage to the any surface beneath the firebox.

(d) Lids that can be gravity operated shall be provided on all roofing kettles. The tops and covers of all kettles shall be constructed of steel sheet having a thickness of not less than 0.075 inch (No. 14 Manufactures' Standard Gage), close fitting and attached to the kettle with hinges in a manner allowing for gravity closing of the lid.

(e) The chassis shall be substantially constructed and capable of carrying the load imposed upon it whether standing still or being transported.

(f) Fuel containers, burners and related appurtenances of roofing kettles in which LP-gas is used for heating shall comply with all the requirements of NFPA Standard 58.

(g) Fuel containers that operate under air pressure shall not exceed 20 gallons in capacity and shall be subject to the approval of the Fire Marshal.

(h) All fuel containers shall be maintained in accordance with the applicable NFPA Standards or at least 10 feet from the burner flame or at least 2 feet from heat or flame when properly insulated.

4.2 Use of roofing kettles.
Asphalt kettles shall not be used inside of a building or on the roof of a building except when approved by the Fire Marshal. For permits see the *Fire Code* and Section 5.2 and 5.4 of this standard.

4.3 Location.
Asphalt kettles shall not be located within 20 feet of any combustible materials, combustible building surfaces or building openings such as windows, fresh air vents or intakes, doors or other wall penetrations.

4.4 Asphalt kettles on the roof of a building.

4.4.1 Secondary containment.
Secondary containment shall be provided for a kettle on the roof of a building. The secondary containment shall consist of a liquid tight pan capable of containing the volumetric capacity of the kettle being protected. The pan shall be constructed of sheet steel having a thickness of not less than 0.105 inches (No. 12 Manufactures' Standard Gage).

4.4.2 Spare LP-gas containers.
Spare LP-gas containers shall not be stored on the roof of a building where an asphalt kettle is in operation in accordance with Section 4.1.1(a) above unless approved by the Fire Marshal in writing.

4.4.3 Attendant.
A trained attendant shall at all times be within 100 feet of a kettle when the heat source is operating. Ladders and similar obstacles shall not form a part of the route between the attendant and the kettle.

4.4.4 Fuel containers.
Portable fuel containers shall not exceed 240-lb water capacity (100-lb gas capacity) and shall be adequately secured to in an upright position. LP-gas connected for use shall be kept a minimum of 15 feet from kettles. LP-gas containers not connected for use shall be kept a minimum of 25 feet from kettles. All containers shall be positioned so that the pressure relief device is within the vapor space of the container at all times.

SECTION 5 --- PERMITS REQUIRED

5.1 Torch Applied Roofing.

5.1.1 Site Specific Permit.
Site-Specific Permits are for one location or address for jobs over $2000 value. Permit Duration — 90 days, but may be extended as needed for up to one year maximum. Fee - $75.00.

5.1.2 Annual Repair Permit.

Annual Repair Permits are for use at different addresses for jobs of less than $2000 value. Duration of permit — one year. Fee - $51.00 for first torch; $38.00 for each additional torch; not to exceed $250.00 per owner.

5.2 Asphalt Kettle on the Roof of a Structure Permit.
For the location where needed. Permit Duration — 90 days but may be extended as needed for up to one year. Fee - $51.00 for first kettle; $38.00 for each additional kettle; not to exceed $175.00 per owner.

5.3 LP-gas Storage / Use Permit.
When the storage of LP-gas is 125 gallons water capacity or more aggregate amount, Permit Duration — 90 days, but may be extended as needed for up to one year maximum.

5.4 Standby Personnel.
Standby Personnel shall be required for roofing operations conducted on the roof of a building classified as a High-rise Building. See Section 2.16 of this standard.

5.5 Obtaining Permits.
All permits may be obtained at the Houston Fire Department Permit Office, 1205 Dart Street; off of Houston Avenue; Telephone: 713-247-8557.

APPENDIX-A

ROOFING OPERATIONS CHECK LIST FOR STANDBY INSPECTORS

TORCHED APPLIED ROOFING:

- A certified person shall be in attendance when an open flame (torch) is in operation. The certification shall be through the " Midwest Roofing Contractors Association"(MRCA).
- An Infrared Temperature Scanner shall be on the roof during the roofing operation.
- At least two approved portable fire extinguishers with a minimum rating of 4-A, 20-B:C.
- A maximum 5 torches in use on the roof, unless approved in writing.
- Maximum cylinder size for hand held torches shall not exceed 30-lb gas capacity. Torch trolleys may use cylinders not to exceed 100-lb gas capacity.
- Torches shall have properly installed stands or brackets that will keep the flame pointed up when the torch is set down.

- Check LP-gas hoses for excessive wear or damage. (Excessive accumulation of tar on the hose could indicate problems)

- At the end of the day or cessation of torch operation there shall be a monitoring period of not less than 30 minutes. During this time the infrared temperature scanner shall be used to determine any areas with temperatures in excess of ambient. Any area indicating a continuous rise in temperature shall be investigated for possible smoldering materials.

- At the end of each day or torch operation the LP-gas cylinders shall have the hoses disconnected and the cylinder opening plugged.

APPENDIX-B

ROOFING OPERATIONS CHECK LIST FOR STANDBY INSPECTORS

ASPHALT KETTLE ON A ROOF:

- The kettle shall have secondary containment.
- LP-gas fuel cylinder(s) shall not exceed 100-lb gas capacity. Only one cylinder per kettle unless approved in advance by the Fire Marshal in writing. Fuel containers shall be secured to prevent from falling over.
- The kettle shall be attended when the heat source is operating.
- Two approved portable fire extinguishers with a minimum rating of 4A, 20-B:C shall be on hand during the roofing operation.
- The kettle shall be kept at least 20 feet from any building opening or combustible materials.

REFERENCES

1. City of Houston *Fire Code*, International Fire Code, 2000 edition, as amended .

2. City of Houston *Code of Ordinances*, No. 94-10609, 01 January, 1995.

3. National Fire Protection Association (NFPA) Standard 58, "Storage and Handling of Liquefied Petroleum Gases".

Conversion factors: 1 inch = 25 mm; 1 foot = 305 mm